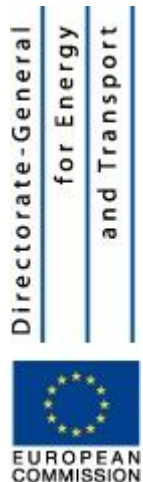




# Results of an international survey related to seaplane operation

Workshop – AERO Friedrichshafen

**Dipl.-Ing. Joachim Schömann**  
**Dipl.-Ing. Benedikt Mohr**  
Technische Universität München



# Contents

- **Identification of the state of the art**
- Operational Issues
- Pilots, Regulations and Certification
- Infrastructure and Maintenance
- Requirements derived from survey

## Identification of the State of the Art

Seaplane & Amphibian aircraft database does not represent current status of:

- Seaplanes in operation
- Missions types

10% of 300+ addressed operators participated in online survey

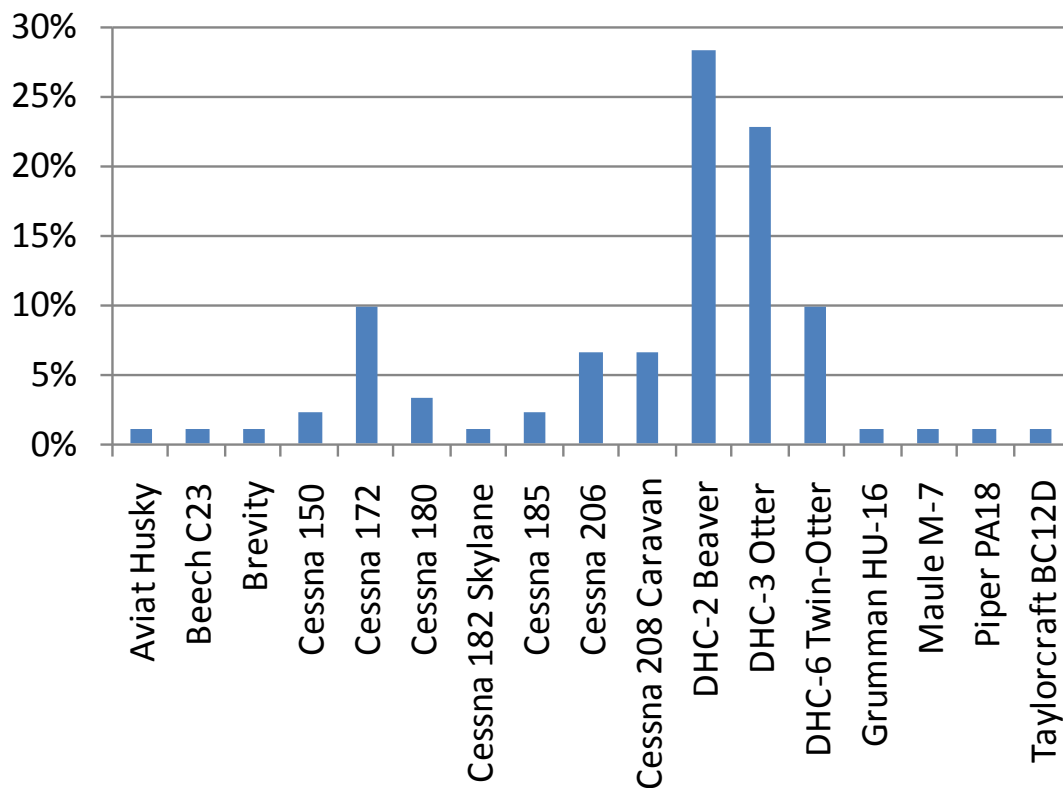
- General Information about the Operator
- Operational Issues
- Pilots, Regulations and Certification
- Infrastructure and Maintenance

## Contents

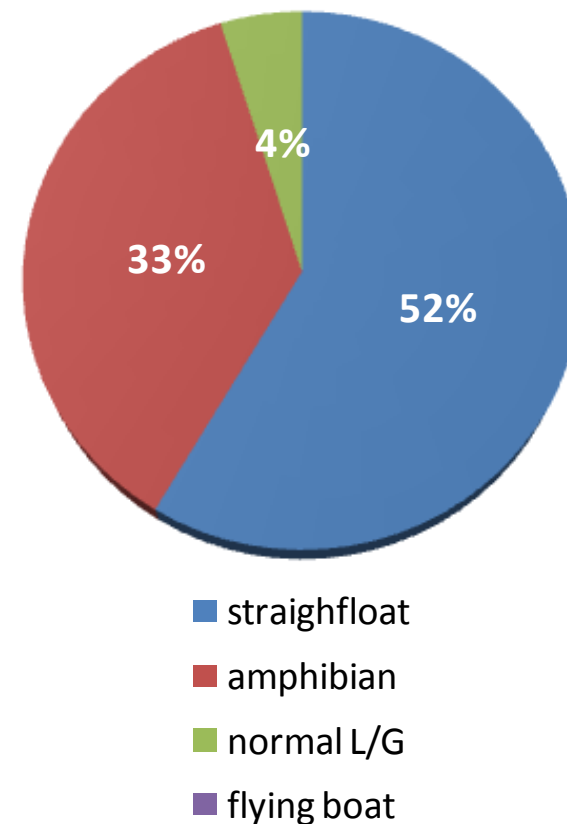
- Identification of the state of the art
- **Operational Issues**
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# Operational Issues: Aircraft

## Aircraft in Operation 2010



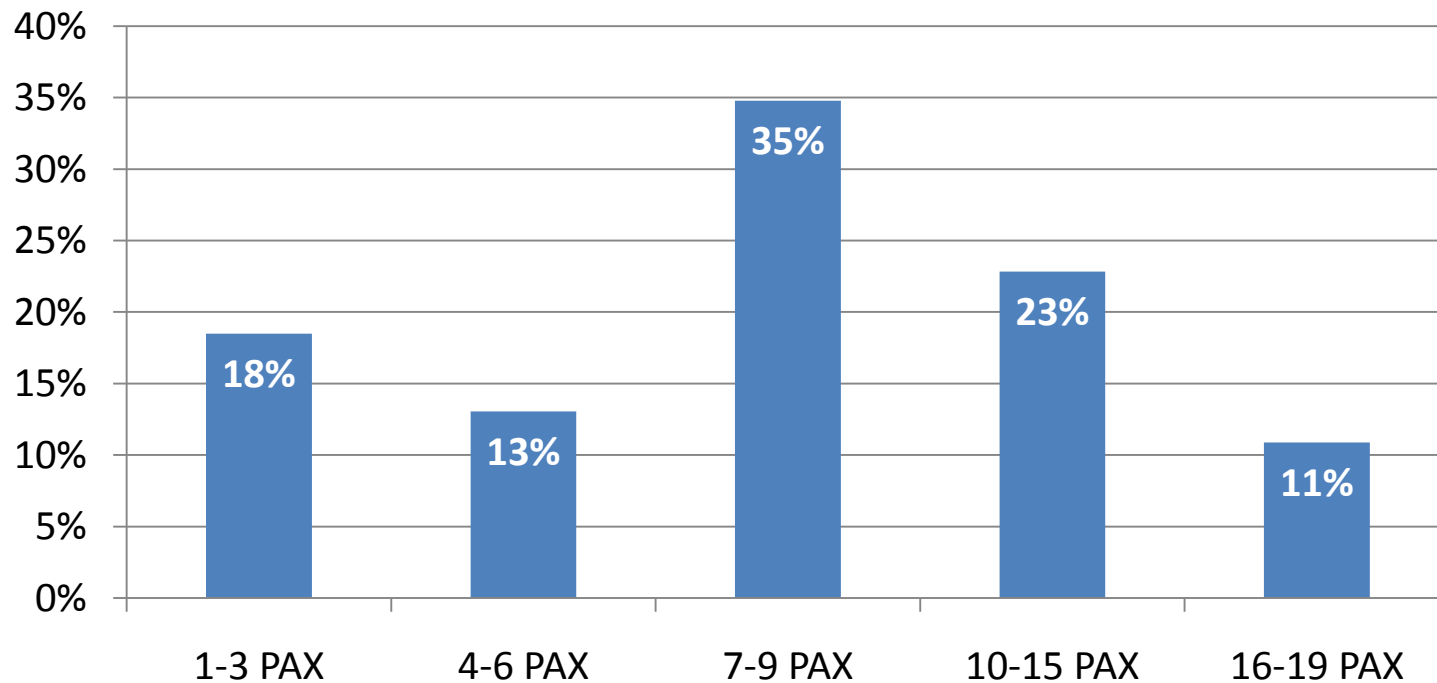
## Undercarriage type



Includes the fleets of operators that did not participate in the survey

# Operational Issues: Aircraft

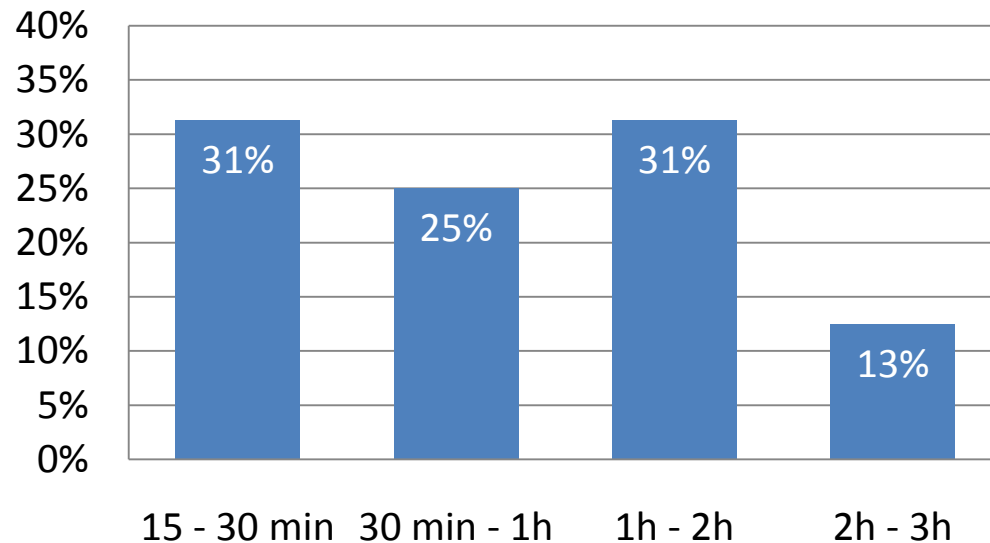
## Size of aircraft in Operation 2010



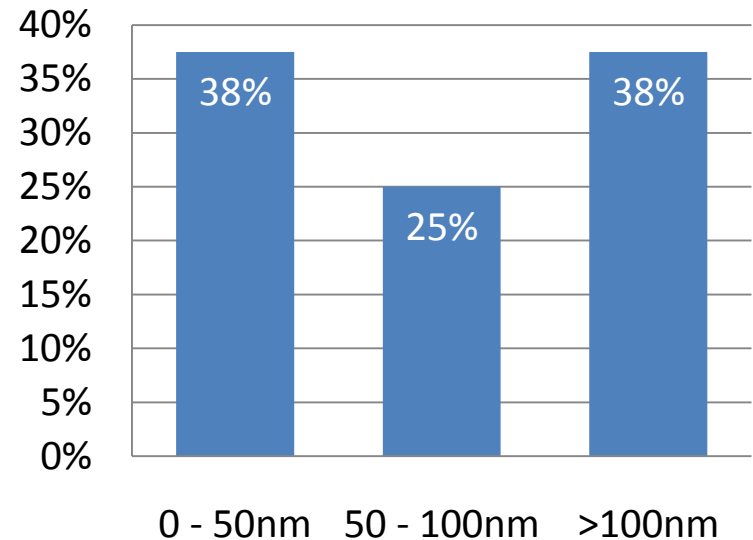
Includes the fleets of operators that did not participate in the survey

# Operational Issues: Operational key figures

### Average flight time



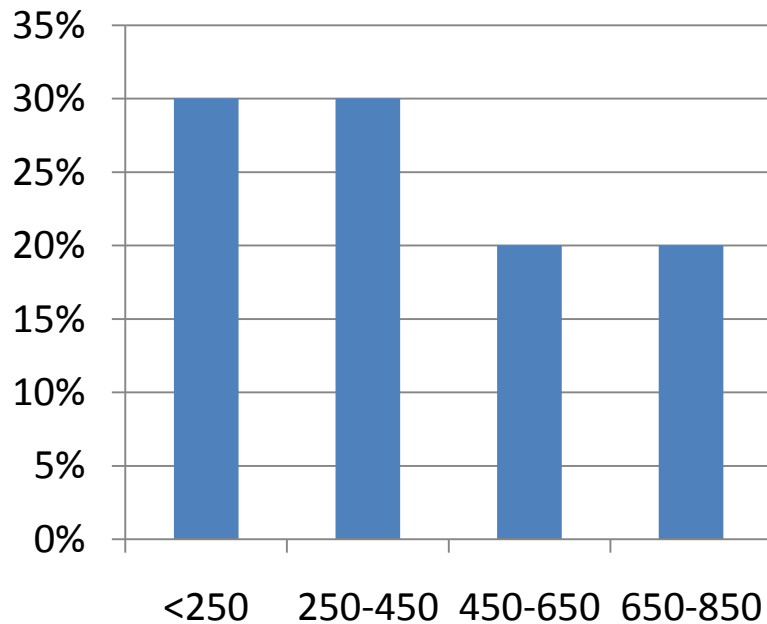
### Average flight range



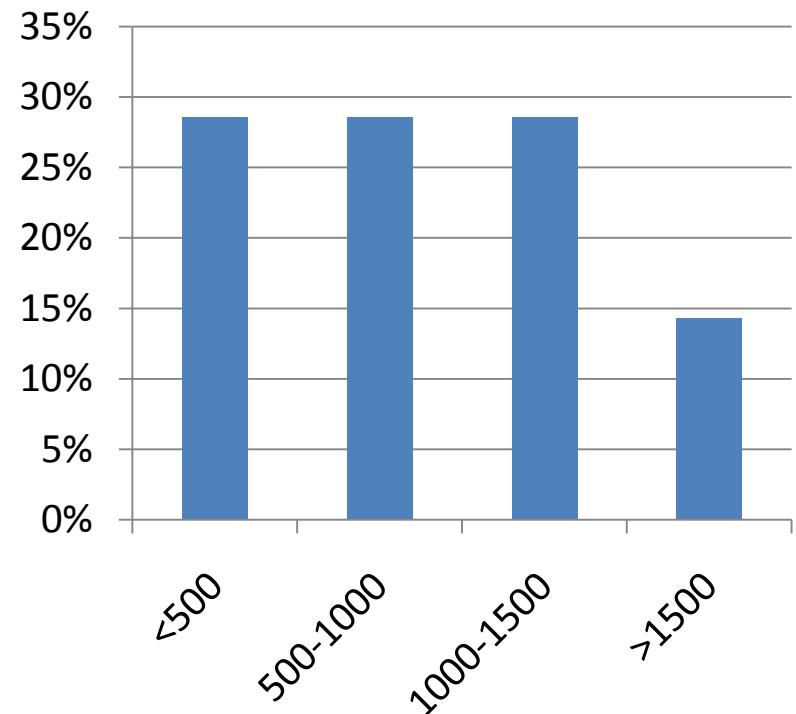
Information provided by 41% of the participants

# Operators' requirements for future European seaplane

Range (in [nm])



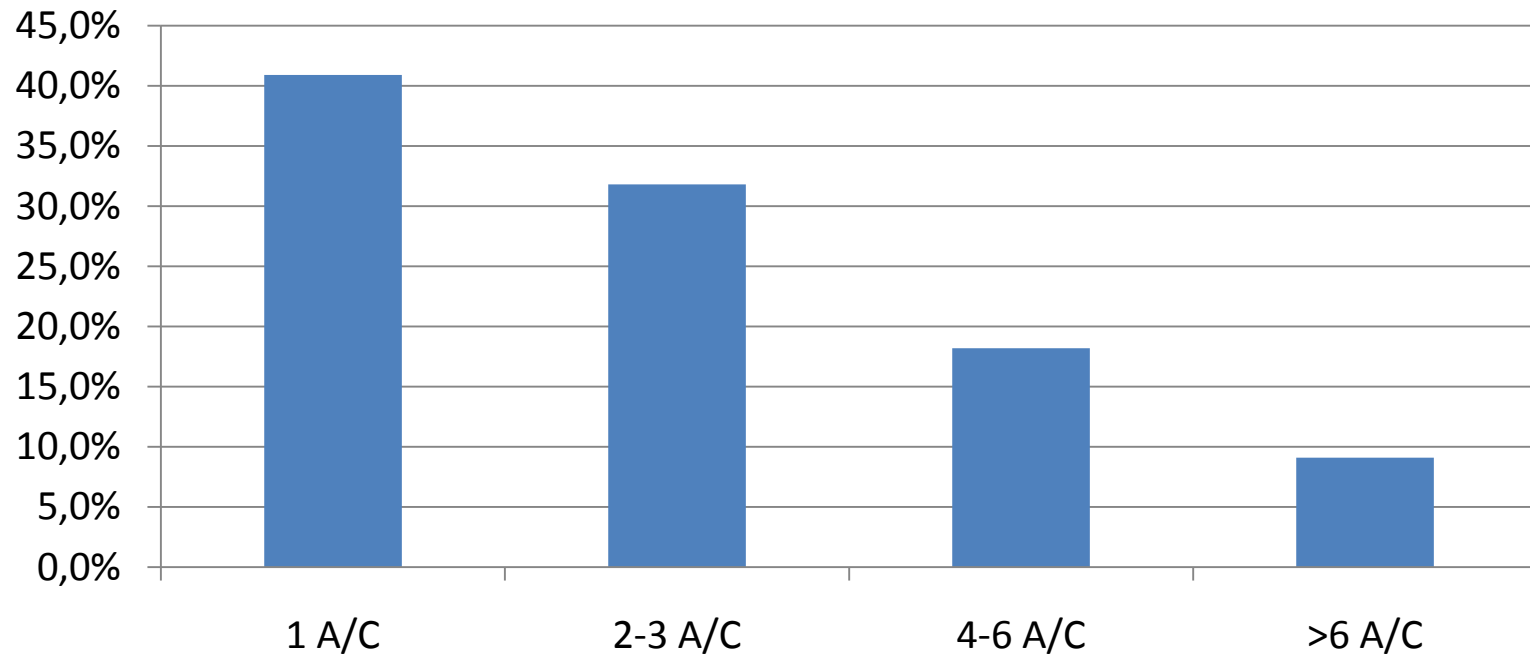
Payload (in [kg])





# Operational Issues: Fleets

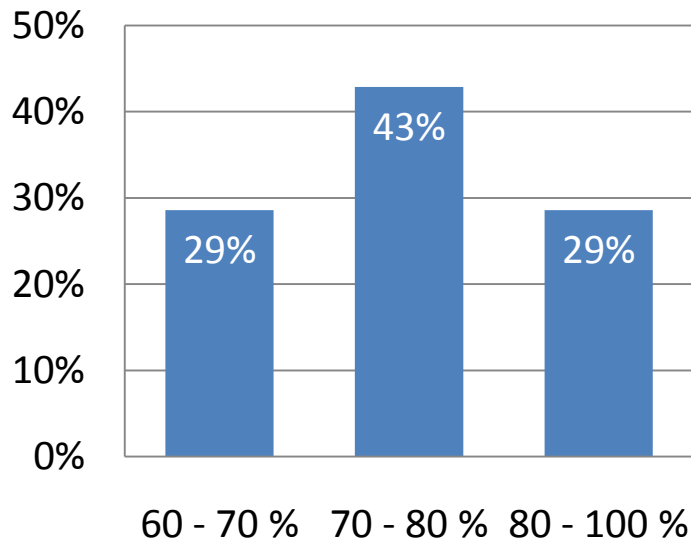
## Fleet of operating carriers 2010



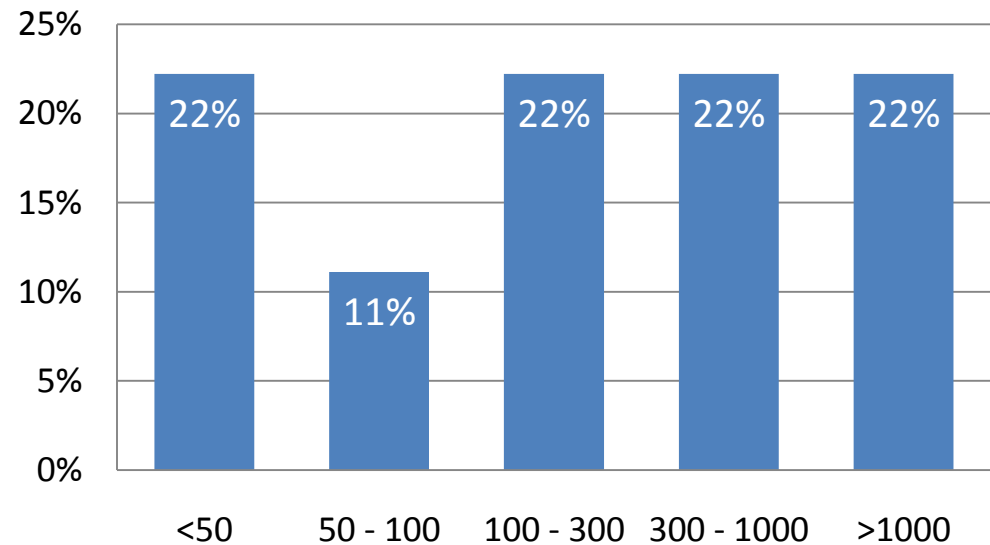
Includes the fleet of the world's largest operator although not a participant

# Operational Issues: Operational key figures

### Average load factor



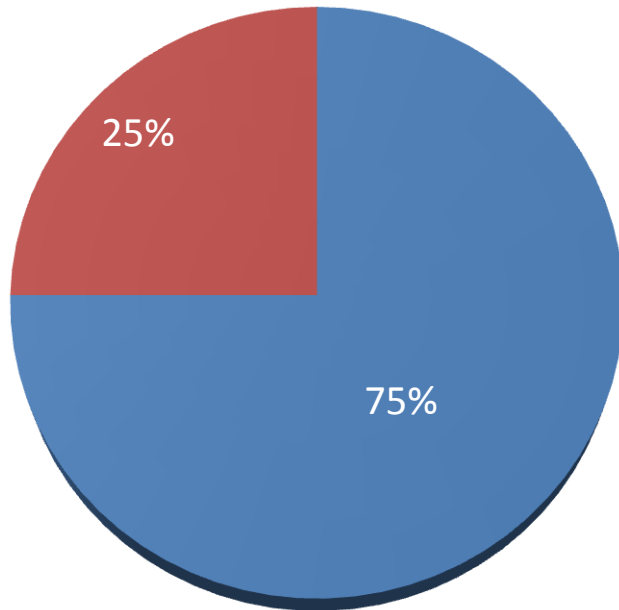
### Flights per year and carrier



Information provided by 41% of the participants

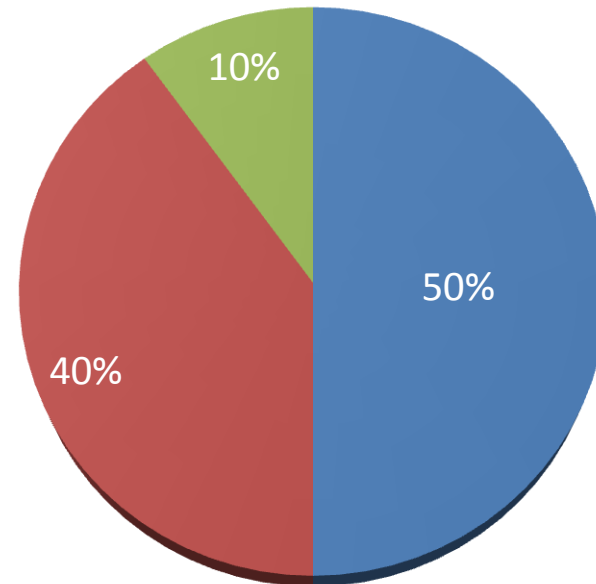
# Operational Issues: Schedule

## Carrier times of operation



■ All-year ■ Summer

## Schedule structure

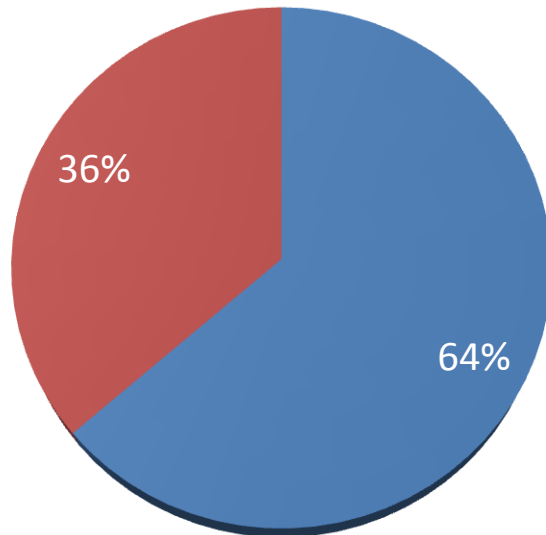


■ Only on-demand  
■ Mostly scheduled flights  
■ Mostly on-demand flights

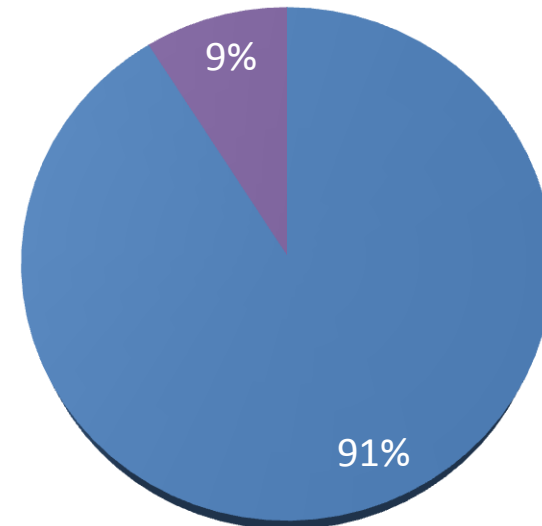
76% of on-demand flights with respect to flight movements

# Operational Issues: Purpose of flight

**Purpose of flight  
(by carrier)**



**Purpose of flight  
(by flight movements)**



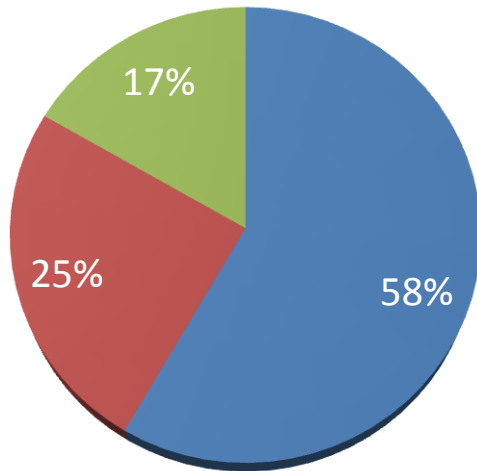
■ Mostly PAX ■ Mostly Other

■ PAX ■ Cargo ■ Fire Fighting ■ Other

Information provided by 61% of the participants

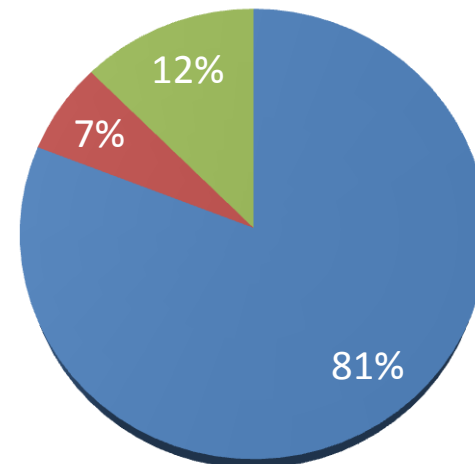
## Operational Issues: Connection type

Connection type  
(by carrier)



- Mostly water-to-water
- Mostly water-to-airfield
- Mostly airfield-to-airfield

Connection type  
(by flight movements)



- Water-to-water
- Water-to-airfield
- Airfield-to-airfield

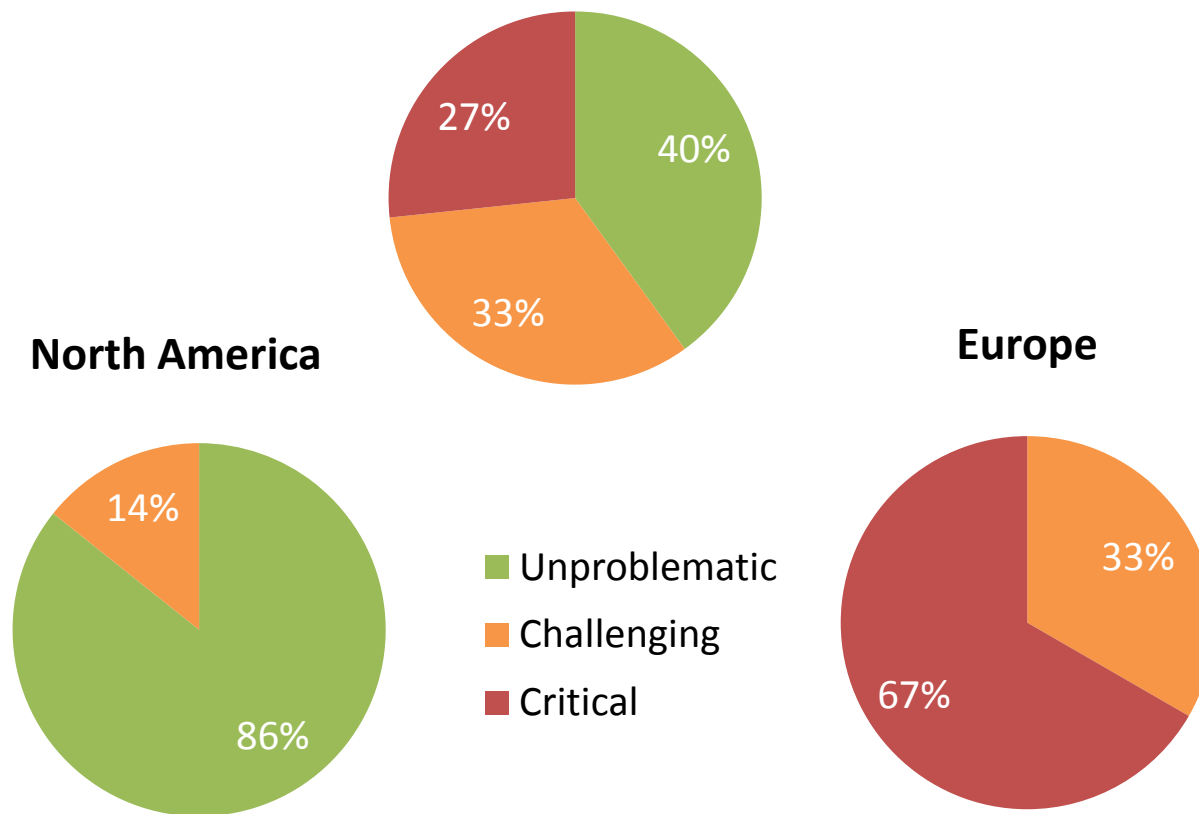
Information provided by 55% of the participants

## Contents

- Identification of the state of the art
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- **Pilots, Regulations and Certification**
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# Pilots, Regulations and Certification: Pilots

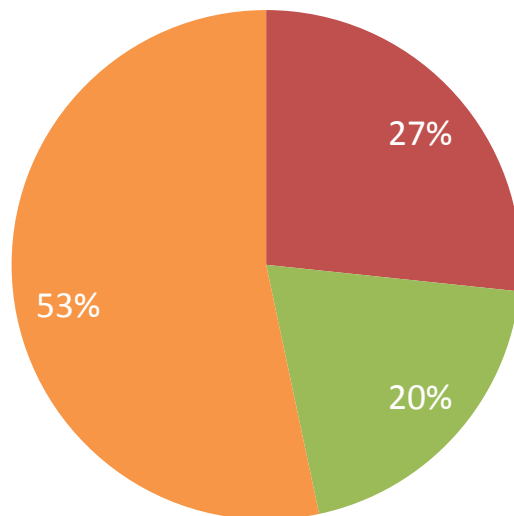
## Availability of pilots: Overall



# Pilots, Regulations and Certification: Certification

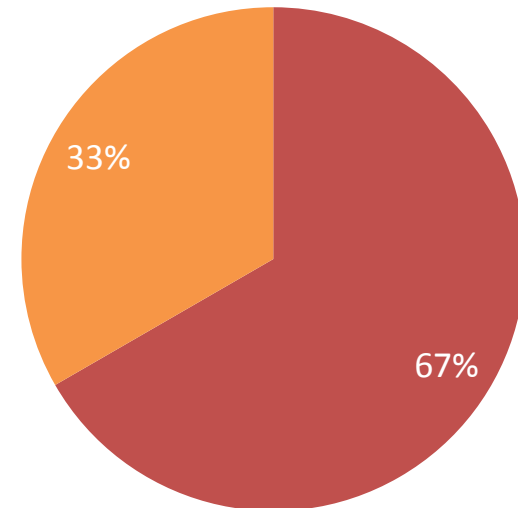
## Certification process for new seaplane operators

Overall



- critical
- unproblematic
- challenging

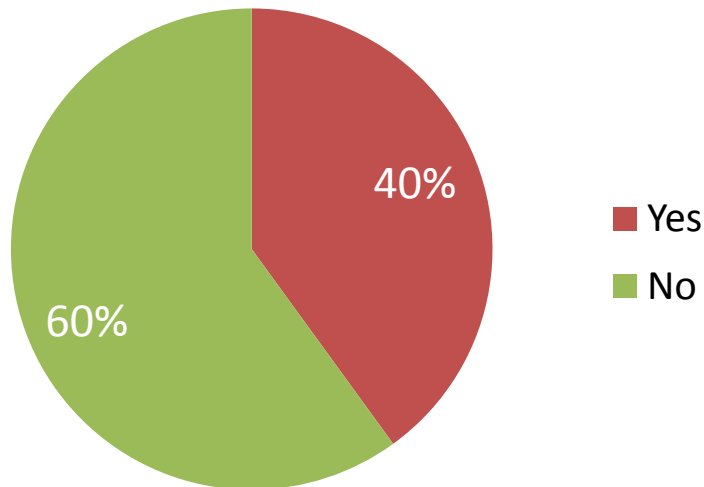
Europe





# Pilots, Regulations and Certification: Certification

**When starting operation, did you have problems with residents or environment authorities?**



**Reasons for problems:**

- Noise
- Operation in or close to National Parks

# Pilots, Regulations and Certification: Certification

Currently, there is no consistent regulation for seaplane operation in the EU (EASA). Which points would you consider, independently from your region, the most important ones to be regulated in a law?

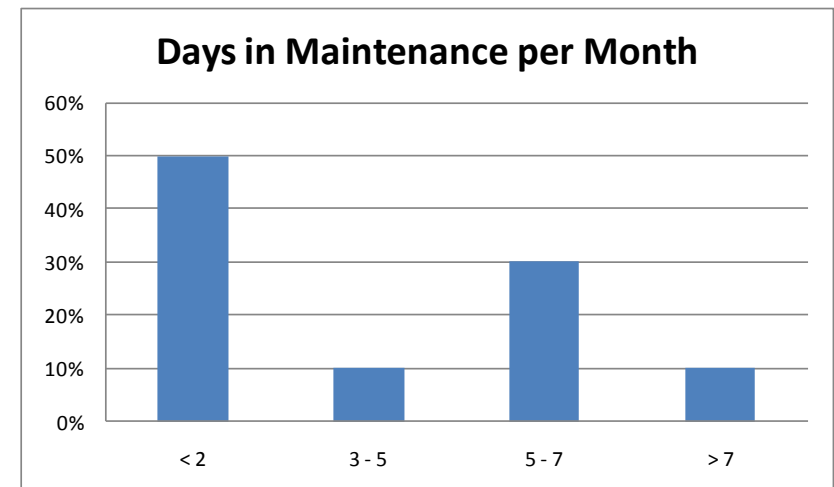
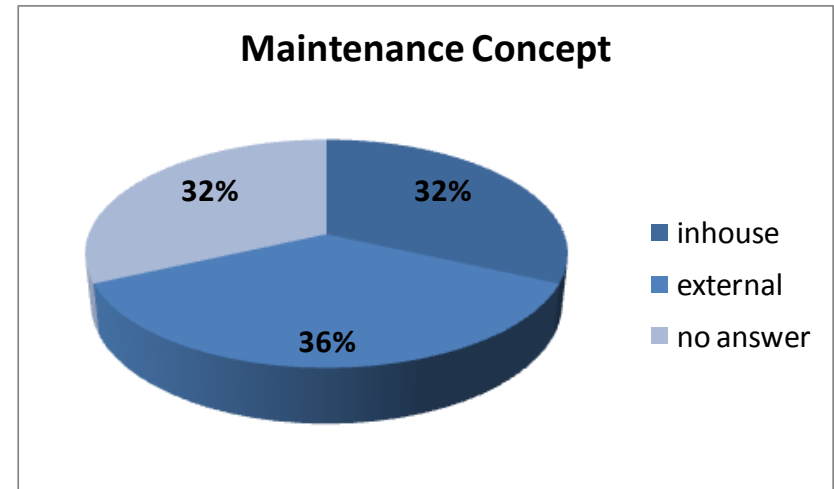
- Waterway availability
- Overflight / noise abatement areas
- Difference between private and commercial operations
- Marine licensing

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## Aircraft Maintenance Concept

- About a third of the operators maintain their aircraft themselves
- It was asked how many days per month the average aircraft is out of service due to maintenance. The number of days ranges from one to six days of maintenance per month. Aircraft which are used commonly (DHC-2 and Cessna 208) have the largest necessity for maintenance with 5 to 6 days per month not in operation.



## Connectivity of seaports to landside infrastructure

- Most operators are connected to some kind of street/ motorway infrastructure but no seaplane operator is connected to larger airports
- However, most businesses seem to be remote locations not closely coupled to other means of transport

	Connection	% of operators
Landing site connected to roads / motorways		91%
Landing site connected to long distance railroad system		5%
Landing site connected to public metropolitan and suburban commuters		14%
Landing site integrated in seaport		23%
Landing site connected to local airfield		23%
Landing site connected to international airport		0%

# Future Seaplane Transport System - Obstacles



Main Problems of Operations	Worldwide	Europe
Availability of licensed pilots	18%	<b>50%</b>
Availability of suitable aircraft	27%	<b>50%</b>
Safety issues	14%	20%
Passenger reservation about seaplanes	0%	0%
Opposition of environmental authorities	<b>41%</b>	20%
Aviation authorities regulations	<b>32%</b>	<b>40%</b>
Naval authorities regulations	18%	20%

## Contents

- Identification of the state of the art
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## Requirements for future European seaplane

- Payload: 9 PAX (19 PAX in extended version) plus luggage
- Range: maximum 850 nm (~ 1600 km)
- Flight speed: 140 – 180 kts (260 – 330 km/h)
- Amphibian usage
- More efficient aerodynamics (no fixed floats)
- Efficient propulsion unit (Diesel, Hybrid-Electric)
- High flexibility (PAX, fire fighting, SAR)
- Corrosion resistance (composite materials)
- Bad weather capability
- IFR capability
  
- Currently



# Any questions ?